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Title: MiniBooNE Neutrino Oscillation Results

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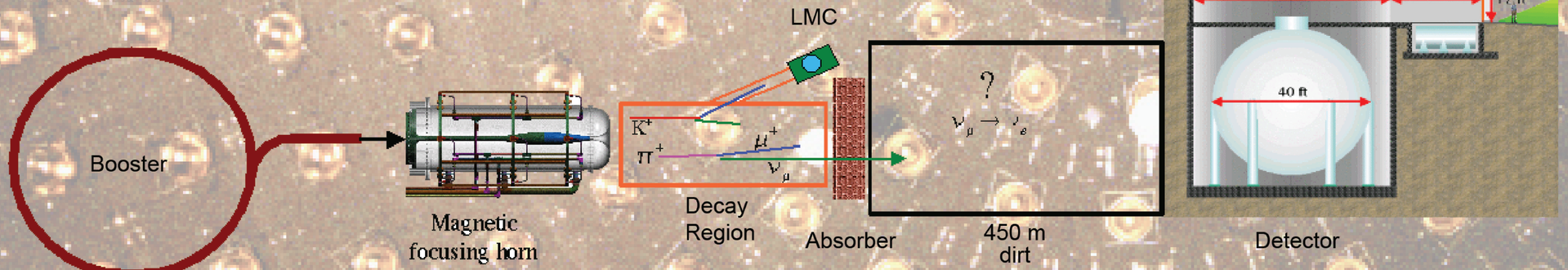
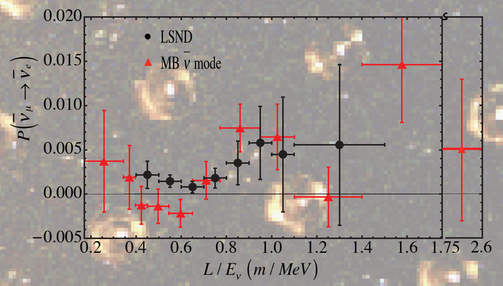
Neutrino Oscillation Results from MiniBooNE

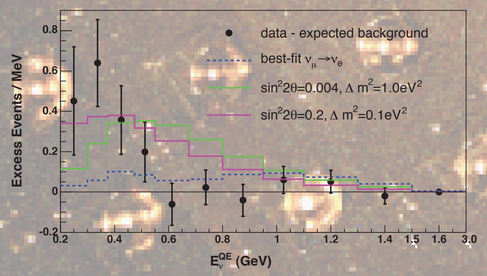
The MiniBooNE experiment has searched for neutrino oscillations with both a neutrino beam and an antineutrino beam. In neutrino mode, MiniBooNE observes no oscillations consistent with the signal observed by the LSND experiment (A. A. Aguilar-Arevalo et al., Phys. Rev. Lett. 102, 101802 (2009)). However, the antineutrino data are consistent with oscillations at ~ 1 eV^2 and consistent with the LSND signal (A. A. Aguilar-Arevalo et al., Phys. Rev. Lett. 105, 181801 (2010)). These data suggest the possibility of CP violation in the lepton sector.

A schematic drawing of the MiniBooNE experiment. Protons from the 8-GeV Booster accelerator at Fermilab interact in a beryllium target, producing pions that are focused by a magnetic focusing horn. The pions then decay in a 50 m decay pipe into muons and neutrinos. The MiniBooNE detector, located 541 m downstream of the beryllium target, consists of a 40-foot spherical tank filled with ~800 tons of mineral oil and covered on the inside by 1520 8-inch photobes. The detector reconstructs neutrinos that interact in the mineral oil.

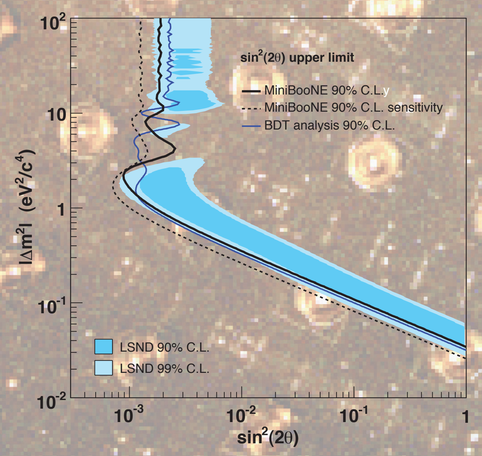




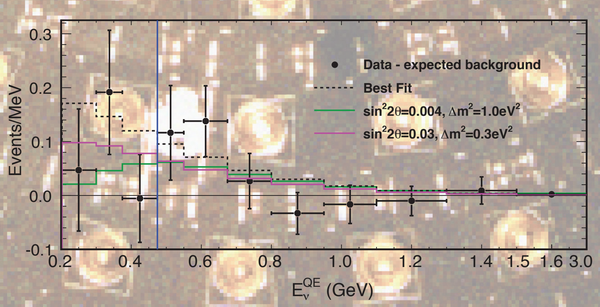
The excess number of events as a function of L/E for LSND antineutrino data (black points) and MiniBooNE antineutrino data (red points). L is is the distance traveled by the antineutrinos, while E is the energy of the antineutrinos. The two distributions are consistent, as expected from oscillations.



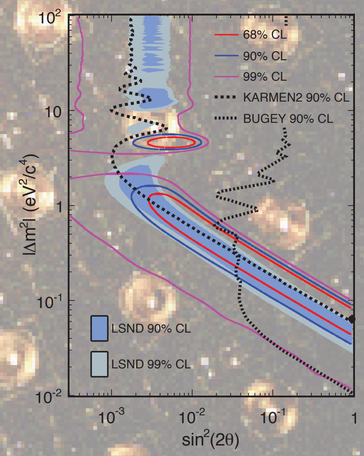
The excess events observed in neutrino mode as a function of reconstructed neutrino energy. Although an excess of events is observed at low energies, no appreciable event excess is observed at higher energy.



The limit on oscillations observed in neutrino mode (black curve) compared with the oscillation region from the LSND experiment (blue region). The MiniBooNE neutrino data are not consistent with the LSND signal.



The excess events observed in antineutrino mode as a function of reconstructed antineutrino energy. Excess events are observed at both low and high energies.



The oscillation region in antineutrino mode (closed curves) compared with the oscillation region from the LSND experiment (blue region). The MiniBooNE data are consistent with the LSND signal in antineutrino mode.

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Contact info or website?

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